

Message Text

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SUBJECT: USG STATEMENTS TO CONGRESS ON LASER RESEARCH

REF: STATE 183937

1. FOLLOWING EXCERPTS FROM RECENT STATEMENTS TO CONGRESS
BY DOD WITNESSES AND ACDA FOLLOW:

(A) EXCERPTS FROM STATEMENT ON THE (DOD) SCIENCE AND
TECHNOLOGY PROGRAM BY DEPY UNDER SECY FOR RESEARCH AND
ADVANCED TECHNOLOGY DR. RUTH M. DAVIS BEFORE THE R AND D
SUBCOMMITTEE OF THE HOUSE ARMED SERVICES COMMITTEE
MARCH 20, 1978:

QUOTE. B. CHARGED-PARTICLE BEAM TECHNOLOGY. IN ADDITION
TO MECHANICAL WEAPON SYSTEMS SUCH AS PRECISION GUIDED
MUNITIONS, INCREASING ATTENTION HAS BEEN GIVEN TO CHARGED-
PARTICLE BEAM TECHNOLOGY. WHY HAS THIS MERITED SO MUCH
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ATTENTION? BECAUSE A PARTICLE BEAM CAN BE AIMED AND
REACH A TARGET IN ONLY A MATTER OF MILLISECONDS (THOUSAND-
THS OF A SECOND), WHICH IS AT LEAST 1,000 TIMES FASTER
THAN CONVENTIONAL WARHEADS.

BY PARTICLE BEAMS WE MEAN AN EXTRAORDINARILY HIGH DENSITY

AND HIGH VOLTAGE BEAM OF ATOMIC PARTICLES SUCH AS
ELECTRONS, PROTONS, IONS, OR NEUTRAL ATOMS. THESE
DELIVER A DIFFERENT TYPE OF PUNCH THAN THE RADIANT ENERGY

BEAM OF A HIGH ENERGY LASER. THE INTERACTION OF THESE PARTICLES WITH THE TARGET CAN BE MORE DESTRUCTIVE THAN A LASER BEAM, AND ADDITIONALLY THE BEAM CAN MORE READILY PENETRATE INCLEMENT WEATHER. YOU HAVE SEEN A TYPE OF CHARGED PARTICLE BEAM IN THE FAMILIAR FORM OF LIGHTNING BOLTS. YOU KNOW OF THE DESTRUCTIVE EFFECT THAT LIGHTNING CAN HAVE. HOWEVER, YOU ALSO KNOW THAT THE EFFECTS OF LIGHTNING ARE QUITE VARIED AND THAT THE PATH OF LIGHTNING IS HIGHLY COMPLEX.

CONSIDERABLE CONFUSION, MISCONCEPTIONS AND UNCERTAINTIES HAVE CLOUDED DISCUSSIONS AND DEVELOPMENTS IN CHARGED-PARTICLE BEAMS. ON THE ONE HAND WE HAVE THE PROMISE OF A WEAPON OF CONSIDERABLE POTENTIAL; BUT ON THE OTHER HAND IT INVOLVES THE SOLUTION TO EXCEPTIONALLY DIFFICULT PROBLEMS IN SCIENCE AND TECHNOLOGY. I WISH TO EMPHASIZE THE USE OF THE WORD "PROMISE" WHENEVER WE DISCUSS A WEAPON. WE MUST REMEMBER THE PROBLEMS IN ADDITION TO THE PROMISE.

I HAVE TAKEN STEPS TO BETTER FOCUS OUR EFFORTS ON THE SCIENCE AND TECHNOLOGY OF CHARGED-PARTICLE BEAMS. PLANS FOR ADVANCED DEVELOPMENT EFFORTS HAVE BEEN CANCELLED.
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INSTEAD, A NEW EXPLORATORY DEVELOPMENT PROGRAM HAS BEEN ESTABLISHED BY THE NAVY. NOW INCLUDED IN THIS PROGRAM ARE EFFORTS ON POWER SWITCHING, GENERATION, AND STORAGE THAT PREVIOUSLY HAD BEEN SCATTERED AS SEPARATED PIECES IN VARIOUS PROJECTS. THESE CHANGES SHOULD SIMPLIFY THE MANAGEMENT OF THESE EFFORTS AND PROVIDE FOR BETTER COORDINATION. ADDITIONALLY, WE WILL BE IDENTIFYING A RESEARCH EFFORT IN THE NAVY TO COMPLEMENT THE EXPLORATORY DEVELOPMENT PROGRAM BY CONCENTRATING ON KEY SCIENTIFIC DEFICIENCIES.

WE HAVE PREPARED AN ANALYSIS OF CHARGED-PARTICLE BEAM TECHNOLOGY TO INSURE BETTER DIRECTION IN OUR FUTURE ACTIVITIES. THIS CLASSIFIED STUDY HAS JUST BEEN COMPLETED, AND IT CORRELATES THE SCIENTIFIC ISSUES AND UNCERTAINTIES WITH THE SCOPE OF APPLICATION AREAS. IN PARTICULAR, (1) IT INDICATES THE EXTENT OF THE REMAINING SCIENTIFIC AND TECHNOLOGICAL UNCERTAINTIES AND THE PROBABILITY OF ELIMINATING THE UNCERTAINTIES ALONG WITH THE ATTENDANT COSTS AND (2) IT IDENTIFIES THE OBJECTIVES OF ON-GOING R AND D EFFORTS AND THEIR RELEVANCE TO ADDRESSING MAJOR SCIENTIFIC UNCERTAINTIES AND TO NEEDED DEVELOPMENTAL ACTIVITIES.

THIS STUDY SPECIFICALLY IDENTIFIES AREAS OF R AND D WHERE NO PARTICULAR PROBLEMS LIE, AREAS OF MAJOR UNCERTAINTY, AND AREAS OF CRITICAL DEFICIENCY REQUIRING HIGH PRIORITY

FOR A VARIETY OF APPLICATIONS INCLUDING FUSION-PLASMA HEATING, INERTIAL FUSION, ADVANCED SIMULATION, LASER PUMPING, RADIATION CONE ECM, AND MICROWAVE GENERATION IN ADDITION TO PROJECTED BEAMS. ALSO, THE STUDY INDICATES WHAT IS BEING DONE TODAY TO REALIZE THE ABOVE APPLICATIONS, INDICATING ONGOING EFFORTS AND WHICH STAGE IN THE R AND D CYCLE THE EFFORTS LIES. THIS STUDY WILL PROVIDE THE GUIDANCE TO DIRECT OUR FUTURE TECHNOLOGY EFFORTS IN AN EFFECTIVE MANNER.

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THE DOD CHARGED-PARTICLE BEAM TECHNOLOGY PROGRAM INVOLVES ALL THREE SERVICES WITH A TOTAL FUNDING OF ABOUT DOLLARS 11 MILLION IN FY 1979. BASED ON FURTHER EVALUATION OF THIS STUDY THERE MAY BE A NEED FOR AN ADDITIONAL DOLLARS 6 MILLION IN FY 1979. END QUOTE.

(B) EXCERPTS FROM FY 79 R AND D PROGRAM - STATEMENT BY DARPA DIRECTOR DR. ROBERT R. FOSSUM BEFORE R AND D SUB-COMMITTEE OF SENATE ARMED SERVICES COMMITTEE MARCH 9, 1978:

QUOTE. 1. SPACE DEFENSE. LAST YEAR WE DESCRIBED SOME EARLY CONCLUSIONS REACHED CONCERNING THE APPLICATIONS OF HIGH ENERGY LASERS IN SPACE. SINCE THEN WE HAVE BROADENED THE EXAMINATION OF THE CAPABILITIES OF THIS TECHNOLOGY AND HAVE CONCLUDED THAT LASERS HAVE UNIQUE AND HIGH PAY-OFF POTENTIAL FOR SOME SPACE APPLICATIONS. WE HAVE ALSO

MADE SUBSTANTIAL PROGRESS THIS LAST YEAR IN ADVANCING THE TECHNOLOGY BASE IN SPACE-RELATED LASER DEVICES AND OPTICS TECHNOLOGY.

THE VACUUM OF SPACE OFFERS THE POTENTIAL FOR FULL UTILIZATION OF THE UNIQUE CHARACTERISTICS OF LASER RADIATION - THE ABILITY TO PROPAGATE LONG DISTANCES WITH MINIMAL SPREAD OF THE LASER BEAM. THIS PROPERTY IS DEGRADED WITHIN THE EARTH'S ATMOSPHERE BY ABSORPTION AND TURBULENCE EFFECTS WHICH REDUCE THE RANGE OVER WHICH EFFECTIVE COMMUNICATION CAN BE MAINTAINED. IN ADDITION, SOME LASER DEVICES ARE ABLE TO ACHIEVE SIGNIFICANTLY HIGHER EFFICIENCY IN THE LOW PRESSURE SPACE ENVIRONMENT THAN IS AVAILABLE AT OR NEAR ATMOSPHERIC PRESSURE.

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THE DARPA HIGH ENERGY LASER PROGRAM IS CONCENTRATING ON THE DEVELOPMENT OF EFFICIENT INFRARED CHEMICAL AND

VISIBLE ELECTRICAL LASER TECHNOLOGIES AS WELL AS PRECISE POINTING SYSTEMS AND LARGE OPTICS REQUIRED TO TAKE

ADVANTAGE OF THIS SPACE ENVIRONMENT. MAJOR FEASIBILITY DEMONSTRATIONS ARE BEING INITIATED TO ESTABLISH THE PRACTICALITY OF LASER SYSTEMS TO ACHIEVE THE PERFORMANCE LEVELS REQUIRED FOR SPACE APPLICATIONS. WE ARE REQUESTING DOLLARS 44.0M, FOR THE FY 1979 PROGRAM TO CONTINUE THE SPACE-RELATED TECHNOLOGY DEVELOPMENT AND TO PROCEED WITH THESE MAJOR FEASIBILITY DEMONSTRATIONS.

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A. TECHNOLOGY ACHIEVEMENTS.

1. HIGH-POWER CHEMICAL LASERS - THE HIGH-EFFICIENCY, LOW-PRESSURE CHEMICAL LASER IS A PROMISING DEVICE FOR HIGH-POWER SPACE APPLICATIONS. LAST YEAR WE DEMONSTRATED LOW-PRESSURE, HIGH EFFICIENCY LASER OPERATION IN SMALL SCALE NOZZLES. THIS YEAR, WE ARE SCALING UP THIS NOZZLE TECHNOLOGY. WE HAVE ALSO SUCCEEDED IN A RECENT DEMONSTRATION OF A FUNDAMENTALLY NEW APPROACH TO CHEMICAL LASERS THAT RELAXES FABRICATION REQUIREMENTS, PRODUCES A LONGER, MORE USABLE GAIN REGION, AND IN SMALL SCALE, SHOWED HIGH EFFICIENCIES.

2. HIGH POWER ELECTRICAL LASERS - THE THRUST OF THIS EFFORT IS TO DEVELOP THE TECHNOLOGY BASE WHICH WILL ESTABLISH THE FEASIBILITY OF HIGH-POWER ELECTRICALLY DRIVEN VISIBLE LASERS. THIS APPROACH OFFERS SUBSTANTIAL ADVANTAGES FOR LONG-RANGE SPACE APPLICATIONS. WE HAVE ACCOMPLISHED KEY MILESTONES IN THIS EFFORT.

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6. PULSED CHEMICAL LASER - KEY PHYSICS DEMONSTRATIONS HAVE ESTABLISHED THE POTENTIAL OF PULSED CHEMICAL DEVICES. CONTINUED EFFORTS WILL BE CARRIED OUT BY THE AIR FORCE AND NAVY HIGH ENERGY LASER PROGRAMS.

7. LASER PROPAGATION - THIS DARPA PROGRAM HAS SUCCEEDED IN RESOLVING KEY ISSUES IN THE PROPAGATION OF LASER BEAMS WITHIN THE ATMOSPHERE. CONTINUED WORK IN THIS AREA WILL BE PART OF CONTINUING DOD HIGH ENERGY LASER PROGRAMS. END QUOTE.

(C) EXCERPTS FROM FY 79 DOD PROGRAM FOR RESEARCH, DEVELOPMENT AND ACQUISITION - STATEMENT BY HON. WILLIAM J. PERRY, UNDERSECY OF DEFENSE (RESEARCH AND ENGINEERING) TO THE US CONGRESS:
QUOTE. -- CHARGED PARTICLE BEAM TECHNOLOGY. NEW PROGRAM DIRECTION IS AIMED AT UNDERSTANDING AND SOLVING KEY TECHNICAL PROBLEMS SUCH AS BEAM PROPAGATION AND BEAM

INTERACTIONS WITH MATTER WITHOUT ATTEMPT AT THIS TIME TO DETERMINE WARFARE POTENTIAL.

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B. FREE-ELECTRON LASER. IN AN AIR FORCE RESEARCH PROGRAM, LASING ACTION HAS BEEN DEMONSTRATED WITH A "FREE-ELECTRON" LASER. DIFFERING FROM CONVENTIONAL LASERS, NO SPECIAL LASING MEDIUM IS EMPLOYED. INSTEAD, THE ESSENTIAL PHYSICAL INTERACTIONS OCCUR WITHIN A SPIRALLING, RELATIVISTIC ELECTRONIC BEAM. THIS COULD PROVIDE A NEW OPTION FOR HIGH ENERGY LASERS WITH THREE UNCLASSIFIED

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TIMES THE EFFICIENCY PREVIOUSLY ACHIEVED AND TUNABLE FROM ULTRAVIOLET TO INFRARED, AS COMPARED TO PRESENT SYSTEMS WHICH ARE NOT CONTINUOUSLY TUNABLE. THE NEXT PHASE IN THE PROGRAM IS TO DEMONSTRATE A SELF-CONTAINED SYSTEM WITH REDUCED SIZE AND WEIGHT.

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5. THE HIGH ENERGY LASER PROGRAM. THE DOD HIGH ENERGY LASER (HEL) PROGRAM IS A HIGHLY INTEGRATED SERVICE/DARPA EFFORT. THE PROGRAM IS DEVELOPING THE TECHNOLOGY BASE FOR LASER DEVICES; POINTING/TRACKING/SUBSYSTEMS AND FIRE CONTROL TO DEMONSTRATE THE FEASIBILITY AND POTENTIAL OF HIGH ENERGY LASERS AS WEAPONS. IF HIGH ENERGY LASER WEAPONS PROVE EFFECTIVE AND COMPETITIVE, THEY COULD BE AVAILABLE FOR SELECTED APPLICATIONS SUCH AS DEFENSE OF SHIPS, AIRCRAFT, HIGH VALUE GROUND TARGETS OR SATELLITES.

THE GOALS AND PRIORITIES ESTABLISHED LAST YEAR REMAIN UNCHANGED FOR THIS EARLY ADVANCED DEVELOPMENT EFFORT. WE ARE REQUESTING DOLLARS 184.1 MILLION (DOLLARS 145.4 MILLION FOR THE SERVICES AND DOLLARS 38.7 MILLION FOR DARPA) FOR FY 1979.

OUR CURRENT GOALS INCLUDE:

VERIFICATION AT THE EARLIEST PRACTICAL DATE THAT HEL WEAPONS CAN BE SUFFICIENTLY LETHAL TO BE COMPETITIVE WITH OTHER MEANS TO PERFORM THE MISSIONS OF INTEREST.

CONTINUING EXPANSION OF THE TECHNOLOGY BASE TO SEEK NEW CONCEPTS IN LASER DEVICES AND OPTICAL SYSTEMS THAT COULD YIELD MARKED INCREASES IN THE CAPABILITIES OF HEL WEAPONS AND NEW APPLICATIONS.

-- SPACE DEFENSE - AS A PART OF THE COMPREHENSIVE DOD UNCLASSIFIED

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HIGH ENERGY LASER PROGRAM PREVIOUSLY DESCRIBED IN SECTION D OF THIS CHAPTER, DARPA IS CONTINUING TO INVESTIGATE THE SPACE APPLICATIONS OF HIGH ENERGY LASERS. THE VACUUM OF SPACE OFFERS THE POTENTIAL FOR FULL UTILIZATION OF THE UNIQUE CHARACTERISTICS OF LASER RADIATION - THE ABILITY TO PROPAGATE LONG DISTANCES WITH MINIMAL SPREAD OF THE LASER BEAM. THIS PROPERTY IS DEGRADED WITHIN THE EARTH'S ATMOSPHERE BY ABSORPTION AND TURBULENCE EFFECTS WHICH REDUCE THE RANGE OVER WHICH EFFECTIVE COMMUNICATION CAN BE MAINTAINED. IN ADDITION, SOME LASER DEVICES ARE ABLE TO ACHIEVE SIGNIFICANTLY HIGHER EFFICIENCY IN THE LOW PRESSURE SPACE ENVIRONMENT THAN IS AVAILABLE AT OR NEAR ATMOSPHERIC PRESSURE.

THE DARPA HIGH ENERGY LASER PROGRAM IS CONCENTRATING ON THE DEVELOPMENT OF EFFICIENT INFRARED CHEMICAL AND VISIBLE ELECTRICAL LASER TECHNOLOGIES. MAJOR FEASIBILITY DEMONSTRATIONS ARE BEING INITIATED TO ESTABLISH THE PRACTICALITY OF LASER SYSTEMS TO ACHIEVE THE PERFORMANCE LEVELS REQUIRED FOR SPACE APPLICATIONS. END QUOTE.

(D) EXCERPTS FROM THE ACDA FY 79 ARMS CONTROL IMPACT STATEMENTS - SUBMITTED TO THE CONGRESS BY THE PRESIDENT PURSUANT TO SECT 36 OF THE ARMS CONTROL AND DISARMAMENT ACT, JUNE 1978:

QUOTE. HIGH ENERGY LASER PROGRAMS
I. PROGRAM DESCRIPTION. A. CAPABILITIES.

HIGH ENERGY LASER (HEL) WEAPONS DO NOT EXIST TODAY BUT THE APPROPRIATE TECHNOLOGIES ARE BEING DEVELOPED BECAUSE, IF THEY PROVE FEASIBLE, THEY WILL HAVE UNIQUE ADVANTAGES COMPARED TO CONVENTIONAL GUN AND MISSILE SYSTEMS. THIS UNCLASSIFIED

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IS PRIMARILY BECAUSE ENERGY IS DELIVERED TO THE TARGET AT THE SPEED OF LIGHT. AS A RESULT THE HEL WEAPON OFFERS:

- NEARLY INSTANTANEOUS TRANSMISSION OF ENERGY TO THE TARGET;

- THE ABILITY TO IMMEDIATELY SENSE THE AIMING ERROR AND CORRECT IT WITHOUT A NEED TO LEAD THE TARGET;

- MINIMAL "SHOT-TO-SHOT" DISPERSION ERROR;

HIGH FIREPOWER POTENTIAL PER WEAPON; AND

- THE ABILITY TO SWITCH RAPIDLY FROM TARGET TO TARGET.

THE DOD HAS ESTABLISHED A COORDINATED EFFORT AMONG THE SERVICES AND DEFENSE ADVANCED RESEARCH PROJECTS AGENCY (DARPA) TO DEMONSTRATE THE FEASIBILITY OF DEVELOPING HEL WEAPONS. THE HEL WEAPON SYSTEM TECHNOLOGY DEVELOPMENT PROGRAM IS STRUCTURED TO PROVIDE THE (DELETED)

THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (USDR AND E) HAS PRIMARY RESPONSIBILITY TO OVERSEE SERVICE PROGRAMS. IN 1974, THE DEPUTY SECRETARY OF DEFENSE ADDED (DELETED) TO AUGMENT SERVICE PROGRAMS. DARPA EXERCISES TECHNICAL DIRECTION OF (DELETED).

THE SERVICES ARE ALSO RESPONSIBLE FOR PROVIDING MUCH OF THE BASIC TECHNOLOGY AND PHENOMENOLOGY UNDERSTANDINGS ON WHICH THEY HAVE BUILT THEIR PROGRAMS. DARPA IS CONCENTRATING ITS RESEARCH ON (DELETED). EACH SERVICE HAS IDENTIFIED (DELETED). THE AIR FORCE HAS SELECTED (DELETED) THE NAVY (DELETED) AND THE ARMY (DELETED). OTHER APPLICATIONS ARE ALSO BEING STUDIED.

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III. ANALYSIS.

THE DOD HEL PROGRAMS ARE IN AN EARLY R AND D STATE, WHEREIN THE POTENTIAL APPLICATION OF THIS NEW TECHNOLOGY TO DEFENSE MISSIONS IS STILL BEING EXPLORED. NO PROTOTYPE WEAPONS HAVE BEEN DECIDED UPON, AND INDEED THE PRACTICAL POTENTIAL OF HEL (COMPARED WITH OTHER WEAPONS) WITHIN THE EARTH'S ATMOSPHERE HAS NOT YET BEEN CONVINCINGLY DEMONSTRATED. (DELETED.) THUS, THE ANALYSIS WHICH FOLLOWS FOCUSES PRINCIPALLY ON THE ARMS CONTROL IMPACT OF WEAPONS WHICH MIGHT RESULT FROM SUCH RESEARCH. THE RESEARCH ITSELF -- OTHER THAN ITS IMPACT ON OTHER NATIONS' PERCEPTIONS OF POSSIBLE APPLICATIONS -- HAS LITTLE NEAR-TERM ARMS CONTROL IMPACT.

A. CONSISTENCY WITH US ARMS CONTROL POLICY AND RELATED PRESIDENTIAL DECISIONS.

CURRENT SERVICE-SPONSORED HIGH ENERGY RESEARCH PROGRAMS CONFORM TO DECLARED ARMS CONTROL POLICIES SINCE THESE

PROGRAMS ARE FOCUSED ON THE DEVELOPMENT OF (DELETED). THE DARPA R AND D PROGRAMS ALSO ARE NOT INCONSISTENT WITH ARMS CONTROL POLICIES SINCE THESE POLICIES PERMIT (DELETED). HOWEVER, AS THE PROGRAMS PROCEED FROM ADVANCED RESEARCH INTO ENGINEERING DEVELOPMENT AND ITS PURPOSE BECOMES MORE CLEARLY DEFINED, THE SITUATION MAY

BECOME MORE COMPLEX. FIRST, TACTICAL WEAPONS WHICH ARE DEVELOPED (DELETED) COULD BE INCONSISTENT WITH THE US ARMS CONTROL POLICY OF (DELETED).
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AN EXAMPLE OF THE POTENTIAL (DELETED) POSSIBILITY IS PROVIDED BY THE (DELETED) SYSTEM BEING DEVELOPED BY THE US NAVY. (DELETED). IF THE NAVY HEL PROGRAM IS SUCCESSFUL. (DELETED). THIS ILLUSTRATES A UNIQUE CAPABILITY OF THE LASER WEAPON SYSTEM. (DELETED).

IF NATIONAL POLICY SHOULD PRECLUDE DEVELOPMENT OF (DELETED) THEN WE WOULD NEED TO ASSURE THAT THE NAVY HEL PROGRAM WOULD BE CONSISTENT WITH SUCH A POLICY. SIMILAR CONSIDERATIONS MAY BE APPLIED TO THE AIR FORCE HEL PROGRAM (EMPHASIZING THE DEVELOPMENT OF LASER WEAPONS FOR (DELETED) AND TO THE ARMY'S HEL (DELETED).

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D. EFFECT ON GLOBAL OR REGIONAL STABILITY.

IT IS NOT POSSIBLE AT THIS TIME TO BE DEFINITIVE AS TO THE IMPACT OF THE US HEL PROGRAM ON GLOBAL STABILITY. ON THE ONE HAND, IT IS CONCEIVABLE THAT BY INJECTING ADDITIONAL UNCERTAINTIES INTO FUTURE MILITARY PROJECTIONS. HEL PROGRAMS COULD ADVERSELY AFFECT GLOBAL OR REGIONAL STABILITY. IN PARTICULAR, THE US (AND SOVIET) HEL PROGRAMS COULD ENCOURAGE OTHER COUNTRIES TO INITIATE OR EXPAND SIMILAR PROGRAMS. TECHNOLOGICAL INNOVATION IS A CENTRAL FEATURE OF THE EAST-WEST MILITARY COMPETITION (DELETED). THUS, NEW TECHNOLOGIES LIKE HEL WEAPONS COULD MAKE PROGRESS IN ARMS CONTROL MORE DIFFICULT AND CONTRIBUTE TO UNCERTAINTY AND INSTABILITY IN GLOBAL AND REGIONAL INTERRELATIONS. ON THE OTHER HAND, IF A NATION BELIEVES AN ADVERSARY IS OBTAINING AN ADVANTAGE IN WEAPONIZING A NEW TECHNOLOGY, THERE COULD BE INCENTIVES TO CONSTRAIN THIS ADVANTAGE THROUGH NEGOTIATION OF AN ARMS CONTROL AGREEMENT. FOR EXAMPLE, THE ABM TREATY MAY HAVE BEEN VIEWED BY THE USSR AS A WAY TO
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LIMIT DEPLOYMENT OF A TECHNOLOGICALLY SUPERIOR US ABM SYSTEM.

IF LASER (DELETED) IT COULD HAVE A DESTABILIZING INFLUENCE ON THE CURRENT (DELETED). THIS NOTWITHSTANDING, IT IS CONCEIVABLE THAT IN THE LONG TERM, THE HIGH ENERGY LASER COULD (DELETED) IT IS NOT POSSIBLE AT THIS TIME TO

BE DEFINITIVE AS TO THE IMPACT OF THE HEL TECHNOLOGY ON GLOBAL STABILITY.

E. TECHNOLOGICAL IMPACT.

THERE IS LITTLE DOUBT THAT LASER WEAPON DEVELOPMENT IS CONSIDERED TO BE AN AREA OF MILITARY TECHNOLOGY HAVING BOTH HIGH PRIORITY AND PRESTIGE VALUE IN BOTH THE SOVIET UNION AND THE UNITED STATES. SOVIET PROGRESS IN THIS AREA ADDS IMPETUS TO OUR OWN PROGRAMS AND PROBABLY VICE VERSA. AS PROTOTYPE HEL WEAPON SYSTEMS BECOME VISIBLE, OTHER TECHNOLOGICALLY ADVANCED COUNTRIES MAY BE ATTRACTED TO THIS NEW AREA OF ARMS TECHNOLOGY, THOUGH THE VERY HIGH COST OF THIS TECHNOLOGY WILL BE A RESTRAINT. INCREASED DIFFUSION OF INTEREST AND KNOWLEDGE IS LIKELY TO TAKE PLACE AS FEASIBILITY DEMONSTRATIONS ARE CONDUCTED DURING THE 1980'S. THE PACE AND INTENSITY OF THE SUPERPOWER HEL WEAPON COMPETITION WILL INCREASE AT A RATE WHICH WILL BE DETERMINED BY INDIVIDUAL AND COLLECTIVE PERCEPTIONS OF THEIR MILITARY UTILITY AND POSSIBLE MILITARY THREATS POSED BY FUTURE LASER WEAPONS, AS WELL AS BY THE ACTUAL SEQUENCE OF POLITICAL DECISIONS TAKEN IN RESPONSE TO THESE PERCEPTIONS.

IF LASER WEAPONS DO BEGIN TO MAKE A DIFFERENCE IN MILITARY CALCULATIONS, THEN THEIR DEPLOYMENT COULD FORCE ADVER-UNCLASSIFIED

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SARIES TO DEVELOP COUNTERMEASURES (NOW IN PROCESS) AND/OR TO INCREASE THE NUMBERS OF OFFENSIVE WEAPONS IN ORDER TO COPE WITH THE IMPROVED DEFENSIVE CAPABILITY OF THE LASER SYSTEMS. IT APPEARS, HOWEVER, THAT THE TECHNOLOGY OF HEL COUNTERMEASURES LAGS BEHIND THAT OF LASER WEAPONRY, TENDING TO PLACE THE BURDEN OF COPING WITH THE LASER ON QUANTITATIVE PROLIFERATION OF OFFENSIVE WEAPONS.

F. VERIFICATION.

IT IS GENERALLY AGREED THAT VERIFYING SOME TYPES OF HEL ARMS CONTROL AGREEMENTS WOULD BE DIFFICULT. THERE ARE FOUR MAIN CLASSES OF HEL VERIFICATION PROBLEMS.

FIRST, ADVANCES IN LASER WEAPON TECHNOLOGY ARE LIKELY IN THE NEAR TERM. THEREFORE, (DELETED).

SECOND, IT COULD BE DIFFICULT TO ACQUIRE INFORMATION ABOUT THE TECHNICAL CHARACTERISTICS OF A (SECURITY DELETION) WHICH MIGHT BE QUITE DIFFICULT TO DETECT. LASER WEAPONS EASILY COULD BE TESTED WITHOUT (DELETED).

IV. CONCLUSIONS.

THE HIGH ENERGY LASER REPRESENTS IMPORTANT NEW TECHNOLOGY WITH MANY POTENTIAL WEAPON APPLICATIONS. HOWEVER, SPECIFIC APPLICATIONS OF THE HEL MAY PROVE DIFFICULT AND SOME APPLICATIONS MAY NOT BE COST EFFECTIVE EVEN IF THEY BECOME FEASIBLE.

THE DOD HEL PROGRAMS ARE STRUCTURED TO PROVIDE THE (DELETED).

HEL WEAPONS ARE BEST SUITED TO WORK (DELETED).
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THE IMPACT OF LASER WEAPONS ON GLOBAL AND REGIONAL STABILITY IS LIKELY TO BE SMALL (DELETED).

IT SEEMS LIKELY THAT AS THE TECHNOLOGY OF HIGH ENERGY LASER WEAPONS MATURES FOR BOTH OURSELVES AND THE SOVIETS, IT MAY RAISE SOME SIGNIFICANT CHALLENGES TO OUR ARMS CONTROL INTERESTS. THUS, THOUGH THE HEL-RELATED R AND D EFFORTS FUNDED IN THIS FISCAL YEAR 1979 BUDGET PROBABLY HAVE NO MORE THAN MARGINAL ARMS CONTROL EFFECTS, THIS TECHNOLOGY DESERVES CONTINUING ATTENTION.
END QUOTE.

2. DEPT. WILL BE POUCHING COMPLETE TEXTS OF ABOVE DOCUMENTS FOR TRANSMITTAL TO ADOD. VANCE

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